

**Remarks**

Reconsideration is requested in view of the preceding amendments and the following remarks. Claim 38 is amended and new claim 39 is submitted for consideration. Upon entry of this Amendment, claims 1-39 are in the application. Support for new claim 39 can be found in the specification at, for example, page 6, last paragraph. No new matter is introduced.

**Rejections under 35 U.S.C. § 101**

Claims 1-38 stand rejected as being directed to non-statutory subject matter. This rejection is respectfully traversed.

All pending claims are directed to methods and apparatus for obtaining estimates of multi-dimensional spectral data that avoid time-consuming, inefficient, brute force methods that typically require acquisition of each data point of interest. As noted in the specification, conventional methods of acquiring  $N$ -dimensional spectroscopic data with  $n$  increments require acquisition times proportional to  $n^{N-1}$ . Thus, multi-dimensional spectroscopic data acquisition can require impractically long acquisition times. Using the disclosed methods and apparatus, this acquisition time can be substantially reduced. Methods and apparatus that can permit reduction of spectroscopic data acquisition time produce useful, concrete, and tangible results, results that are similar to, but more readily obtained, than those produced by conventional spectroscopic equipment. To emphasize the practical, tangible results obtainable with the claims methods and apparatus, claim 38 is currently amended to recite a method of obtaining multi-dimensional nuclear magnetic resonance (NMR) spectroscopic information for a specimen.

The Office action states that the claims “reflect an abstract mathematical idea without a concrete, tangible result.” In particular, the Office action states that the first five lines of claim 1

“denote intertwined 3D data coupled to a method step without a real-world, specific application.”

No language of any other claim is identified. First, claim 1 plainly produces a useful result – multidimensional spectral information based on spectroscopic data sets of a dimension less than that of the multidimensional information. According to the MPEP,

If the record as a whole suggest that it is more likely than not that the claimed invention would be considered a practical application of an abstract idea . . . , then USPTO personnel should not reject the claim. MPEP 2100-13.

Because the method of claim 1 produces a practical result, claim 1 should not be rejected, and for at least this reason, the rejection of all claims under 35 U.S.C. § 101 should be withdrawn.

Second, even if the first five lines of claim 1 were directed to an abstract idea, the claim is still patentable.

The conclusion that a claim includes a 35 U.S.C. 101 judicial exception [such as an abstract idea] does not end the inquiry because the practical application of a judicial exception may qualify for patent protection. MPEP 2100-11 (emphasis added).

Thus, because claim 1 is directed to a practical application, even if claim 1 included an abstract idea, claim 1 would be patentable. For at least this reason, the rejection of all claims under 35 U.S.C. § 101 should be withdrawn.

Third, the Office action fails to establish a *prima facie* case of unpatentability.

If USPTO personnel determine that the claimed invention preempts a 35 U. S.C. 101 judicial exception, they must identify the abstraction . . . and explain why the claim covers every substantial practical application thereof. MPEP 2100-13.

No abstract idea is identified, and the Office action does not assert that claim 1 preempts the use of this unidentified abstraction. Thus, a *prima facie* case of unpatentability has not been established. For at least this reason, the rejection of all claims under 35 U.S.C. § 101 should be withdrawn.

Fourth, although the Office action contends that the method of claim 1 is not “concrete,” no reasons for this contention are provided. According to the MPEP, the opposite of “concrete” is “unrepeatable and unpredictable.” MPEP 2100-12. The method of claim 1 is both repeatable and predictable, and the Office action provides no reasons or evidence that the method of claim 1 would not be repeatable and predictable. For at least this reason, the rejection of all claims under 35 U.S.C. § 101 should be withdrawn.

No portions of claims 10-38 are specifically identified as including an “abstract idea.” Insofar as the rejection of claims 10-38 is based on the rejection of claim 1, this rejection is traversed for the reasons discussed above. If there is some other basis for rejection, clarification is requested. Thus, for at least the above reasons, the rejection under 35 U.S.C. § 101 should be withdrawn.

Although the rejection of claims 10-38 is not belabored herein, it is noted that at least some of these claims are directed to apparatus (for example, claims 18-23 and 30-32) and that claims 10-38 recite features and combinations of features that further demonstrate practical, tangible results. For example, independent claim 11 recites providing a series of stimuli to an object and varying the times between the stimuli to form at least first and second multi-dimensional data sets. Some claims recite that the object is a protein or a heteronuclear labeled protein (for example, claims 16-17). These features also demonstrate that the claimed methods produce useful, tangible results –spectra of real world objects. Claims 18-38 similarly produce useful, tangible results. For example, claim 20 recites peak frequencies and associated data rates, claim 22 recites an NMR machine, and claims 23 and 27-28 recite multi-dimensional NMR data sets. Thus, for at least these reasons, withdrawal of the rejection under 35 U.S.C. § 101 is requested.

### **Miscellaneous Remarks**

In the above remarks concerning the rejection under 35 U.S.C. § 101, claim 1 was noted as being directed to 3D data sets. For clarification, claim 1 recites “multi-dimensional data sets,” and 3D data sets are only one example of such data sets.

Applicant acknowledges with gratitude that claims 1-38 are indicated as allowable over the cited art if the rejection under 35 U.S.C. § 101 is overcome.

The undersigned thanks Examiner Stevens for his consideration in a telephone conference on December 6, 2006 in which claim rejections under 35 U.S.C. § 101 were discussed and for his suggestions concerning potential claim amendments. The consideration of the previously filed Information Disclosure Statements is also noted with gratitude.

### **Conclusion**

In view of the preceding amendments and remarks, all pending claims are in condition for allowance. If any questions arise concerning this Amendment, or if a telephone conference would expedite prosecution, the Examiner is respectfully requested to telephone the undersigned.

Respectfully submitted,

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